

By Don Talend

Military Reserve Center Preserved

Jim Irely, vice president of Gap, PA-based Berner Construction Inc., has made a construction career out of renovating US military bases. So, in 2005, when the US Navy needed a shoreline stabilization system reconstructed at the venerable Floyd Bennett Field Marine Corps Reserve Center on the southern tip of Brooklyn, NY, his experience with a wide variety of base projects helped him to win the bid. Scheduling work around Jamaica Bay's tides and working in a wet environment were important aspects of the tricky five-month project.

Jim, a civil engineer, and Andrea Irely, a chemical engineer, founded Berner Construction in 2002. They started the company to provide construction and remediation services to largely support the ongoing effort of the federal government to address the military bases affected by the US Department of Defense's base realignment and closure program. While Berner Construction was diversifying its services from base renovations, the need for shoreline stabilization at Floyd Bennett Field had become critical and Irely stepped back into a familiar role.

Floyd Bennett Field, New York City's first municipal airport, was built in 1931 and named in honor of naval aviator Floyd Bennett, pilot of the first flight over the North Pole in 1926. It was constructed to divert the increasing volume of air traffic to New York City away from Newark Airport, where most New York-bound flights landed. By 1933, Floyd Bennett Field was the second busiest airport in the country. It was the landing site for Howard Hughes and other famous aviators who flew around the world in the 1930s, was conveyed to the US Navy in 1941, and served as a major stateside air base during World War II.

Long past its prime as a major military base, Floyd Bennett Field began showing its age in recent years. An old steel sheet pile seawall along the shoreline had deteriorated over the years to the point where it had par-

tially collapsed. Shoreline erosion had begun to occur as a result, causing some damage to a reserve center parking lot. "The wall had deteriorated to the point where it was falling in on its own weight; the Navy wanted to mitigate that," Irely says. "The seawall was made from steel sheeting that is three-eighths of an inch thick and standing above the water line 15 or 20 feet high. Predominately, the job was hazard mitigation."

Berner Construction was contracted by one of the Navy's Environmental Military and Construction contractors to provide labor, equipment, and supervision to replace 1,200 feet of revetment seawall. The company started work in June 2006. The first task was to demolish the existing seawall. "Over time, holes rusted through the wall and waves would come in and erode the shoreline," notes Irely. "They tried to bolster it with old blocks of concrete. During the reconstruction effort, we pulled out the concrete blocks, regraded the shoreline, and rebuilt the armor rock revetment wall."

The construction team first installed a silt fence for erosion control. Then wood, asphalt, and concrete debris were removed from behind the existing sheet pile wall.

Removal of the existing concrete cap on the sheet pile wall followed before the steel sheet pile wall was removed above the mud line.

With the existing structure removed, the team went to work on constructing a front-sloping stone revetment seawall that would stabilize the shoreline for many years in the future. The underwater base of the seawall was to be sloped to break the wave action and prevent erosion. First, the existing side slope was regraded. Then, nonwoven geotextile fabric was installed to the mud line.

Installing the fabric was arguably the most difficult aspect of a project that, overall, required the team to schedule work around the tide in Jamaica Bay. "We changed our start time almost every day to accommodate the tide schedule," says Irely. "If the low tide was at five o'clock in the morning, we might start at ten in the morning to catch the low tide on the way back in the afternoon—that way, we weren't using lights.

"To perform the rock placement, we followed the tide out and then back in again," he continues. "We divided the project in half; half of the project was in the water and half wasn't. The water level reached halfway up the slope during high tide. On the days where



The first task was removal of the steel sheet seawall, which had badly deteriorated.



The shoreline at the Floyd Bennett Field Marine Corps Reserve Center in Brooklyn, NY, recently required stabilization. A deteriorating steel wall (above) was replaced with a stone revetment wall (below).

we couldn't work in the water, we'd work on the top of the slope. If there was a full moon, there was a lower low tide and a higher high tide, so you had to work faster."

The cross-section of the slope was 30 to 35 feet long, with a 3-foot delta. "We'd put two grade stakes down—one at 25 feet down and one at 15 feet down—and we'd grade to them," notes Irej. A Topcon GTS-236W Electronic Total Station and RL-H3C Rotating Laser were used to hold grade and then check the grade to make sure that the slope was not overfilled or underfilled and, thus, uniform. "At the end of the day, you're an artist and you want your work to look good," Irej argues. "Periodically, about once every three days, we would put a guy in waders and a life vest at low tide to check the grade from the water's edge to be sure that we were meeting the intent of the design."

Berner Construction's total station was part of Topcon's GTS-230W series, the first electronic total stations with wireless operation. This design eliminates the use of a cable from the data collector to the instrument. The total station was primarily a quality-control tool that was used during and after material placement. "We would check the subgrade before we placed the material, and then we would check it periodically before we would place the stone," says Irej.

Irej recalls how difficult it was to get the fabric into place. The excavator operator weighed down the fabric with the first of three layers of rock, a bedding material. "As they were placing the fabric, the operator would have a bucket of fine crushed stone—the bedding material—to sprinkle on it to



weigh it down. He was working in conjunction with the laborers as they were putting the fabric down. We worked in 25-foot sections, across the entire cross-section, since that was about the distance we could get done in a tide change."

The layer of crushed bedding material was 6 inches deep. The next layer was 3 feet thick and consisted of two layers of granite armor rock. The first layer consisted of material with a smaller particle size to provide a base for, and fill gaps in, a second layer with a larger particle size.

The logistics of constructing the armor rock layer proved challenging as well. A very large quantity of material was required for

the new revetment wall. It was delivered by barge and off-loaded at strategic locations along the seawall. "Rock was barged in from a quarry just north of the city," says Irej. A second barge unloaded the rock from the first barge using a clamshell attachment. "The issue was that it's a big rock that requires a steel truck for hauling. The likelihood of getting the quantities delivered at the time we needed it was not that great, so bringing it in by barge was more manageable."

The final stage of the project included constructing a new stormwater interceptor trench along the top of the new armor rock revetment wall and repaving the parking lot. By early November 2006, the project was complete, and the base was protected from Jamaica Bay's powerful wave action for at least another 80 years. **EC**

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